THE SPIRAL ORBIT

in

CELESTIAL MECHANICS

by

J. G. A. GOEDHART

"CELESTIAL ORBITS ARE **NOT** ELLIPSES, NOR CAN THEY EVER BE PARABOLES OR HYPERBOLES."

INTRODUCTION

To

Analytical Mathematical Astronomy (A.M.A.)

By

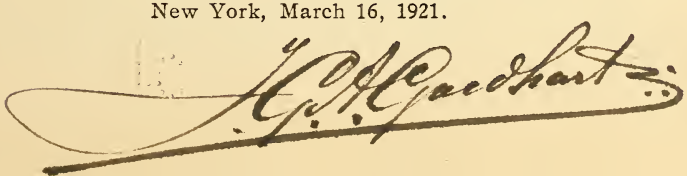
J. G. A. GOEDHART

Officer of the Royal Netherlands Navy, Retired

H. Poincaré— "Les méthodes nouvelles de la Mécanique Céleste" Paris 1892. Page 1.

"Le but final de la mécanique céleste est de résoudre cette grande question de savoir si la loi de Newton explique à elle seule tous les phénomènes astronomiques."

New York, March 16, 1921.



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Smithsonian Institution
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from the author
J. C. H. Grabau

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PREFACE

L. S.

In this brochure I intend to introduce the new and original *"Analytical Mathematical Astronomy"* which is greatly different from *"Contemporary Astronomy"*.

In what way is it different?

CONTEMPORARY ASTRONOMY is based upon:

First: The Law of Gravitation of Newton.
Second: The Three Laws of Kepler.

These Laws of Kepler have been obtained by him in an experimental way. Kepler took the different results of the observations and computations which already had been made by him and other astronomers and compared them until he at last arrived at the conviction, that certain obtained relations were the actual truth. He then incorporated his discoveries in the so called Three Laws of Kepler, and presented them to the world.

The scientific world accepted these laws; and these, with Newton's Law of Gravitation, formed the foundation of mathematical astronomy.

Kepler's manner of investigation, however, was merely contemplative and superficial. He considered the phenomena in the solar system from the outside, without seeing any of the deeper questions, neither

was there any possibility of grasping former situations, nor was there any indication of the origins of those phenomena.

ANALYTICAL MATHEMATICAL ASTRONOMY is based upon a quite contrary manner of investigation. I have attacked the problems connected with the same phenomena, which interested Kepler so much, from the opposite direction. I have attacked them in the analytical way. I started my research from their very origins, and have been rewarded by a startling abundance of revelations.

May the contents of these pages, which *only claim to give an introduction* to the extensive revolutionary work that I have ready for publication, awaken the interest of the readers.

March 16, 1921
16628 Endora Road,
CLEVELAND, OHIO.

J. G. A. GOEDHART,
(*From Amsterdam, Holland*)

The Analytical Mathematical Astronomy

"But above all things Truth beareth away the Victory"
—Inscription New York Public Library

Concise Historical Review

THE CIRCULAR CURVE IN CELESTIAL ORBITS

Different conceptions of the organization of our solar system have been evolved during the last centuries of history; whence the following theories:

PTOLEMY, Egyptian Astronomer, about 200 A. D. taught the theory that:

> The earth is in the centre of a system of eight large hollow spheres, on the surface of each is revolving a planet in a circular curve with the earth in its centre.

COPERNICUS, a Prussian priest, about 1550 A. D. advanced another theory:

> The sun is the centre of the solar system, the planets revolving around the sun in circular curves, however, the sun being placed slightly excentric.

THE ELLIPTICAL CURVE IN CELESTIAL ORBITS

KEPLER, a Bavarian astronomer, issued his three laws about 1620 and contended:

> The planets, comets, etc. revolve in elliptical orbits around the sun, which is placed in one of the foci.

THE PARABOLIC AND HYPERBOLIC CURVE IN CELESTIAL ORBITS

SIR ISAAC NEWTON, an English mathematician, discovered the Law of Gravitation in 1687 :

> Gave the mathematical proof of the three laws of Kepler, and of the theory that in certain circumstances the secondary bodies had to move around their central celestial bodies, along parabolic or hyperbolic curves.

THE SPIRAL CURVE IN CELESTIAL ORBITS

My *"Analytical Mathematical Astronomy"* in 1921 teaches the following theory:

> Secondary celestial bodies revolve in spiral orbits around the mutual centre of gravitation of all component bodies of a system, be it a solar, a planetary or a stellar system.

The Six Principal Laws

being, with the law of Gravitation of Newton, the foundation of this Analytical Mathematical Astronomy (A. M. A.)

FIRST LAW: (*Fundamental*)

to be considered as of the same importance as the law of Newton, being its natural partner.

The squares of the centriful forces (symbol = Fl) inherent in any moving celestial body, around any centre of gravitation, following an undisturbed orbit, which always will be a spiral, are inversely proportional to the fifth powers of the distances, (between the centres of gravitation of the system and of the secondary body.)

$$Fl_0^2 : Fl_1^2 = \rho_1^5 : \rho_0^5$$

Remarks to the FIRST LAW:

1.—This law is the principal feature of A.M.A., *it being the missing link* in the fundamental knowledge about the movement in heavenly systems and their structures.

2.—*Now* we are enabled to answer the question composed by H. Poincaré, and used as motto on the title page:

> "Le but final de la mécanique céleste
> est de résoudre cette grande question
> de savoir si la loi de Newton explique
> *à elle seule* tous les phénomènes astronomiques."

with a very determined: *No! by lack of this missing link,* because this first Law forms the *second pillar* of the foun-

dation of the scientific building, which was staggering upon its present half foundation—the *first pillar*: Newton's Law of Gravitation.

3.—After having used this first law in its various applications, and after having obtained the results of hitherto unsolvable problems, it has been revealed that Newton's law is *rigorous* in the most mathematical sense of the word.

4.—The combination of these two laws, made it possible to obtain the set of five other laws which have to replace the hitherto prevailing laws of Kepler.

5.—The whole A.M.A. is built on the foundation of these seven laws of which Newton's Law of Gravitation and the above mentioned *first law* are the fundamental ones.

SECOND LAW: (*Substitute for the 1st Law of Kepler*)

Secondary celestial bodies revolve around the centres of gravitation of planetary systems in excentric logarithmic spiral orbits, the asymptotes of which are ellipses.

Remarks to the SECOND LAW:

1.—The excentricity of these orbits is due to a kind of disturbance described and dealt with in A.M.A.; an undisturbed logarithmical spiral orbit is *not* excentric; its asymptote is a circle.

2.—To this circle has been given the name in A.M.A. of *standard orbit* and in accord to that, is the name of the uniform velocity in this orbit *Standard Velocity*, and the semi-diameter of that orbit has been baptised in A.M.A. *Standard Distance.*

3.—The equation of the undisturbed, *not* excentric logarithmical spiral is:

$$\rho_n = \rho_o : a^{\frac{2\varphi}{p \propto V_o \sqrt[4p]{a^{3n}}}}$$

This equation is explained in A.M.A.

THIRD LAW: (*Substitute for the 2d Law of Kepler*)

The radius vector of any secondary body in its spiral orbit sweeps in equal times unequal areas, in the way that if eventually the attractive force surpasses the centrifugal force, the areas will gradually decrease; in the opposite situation they will gradually increase.

Remarks to the THIRD LAW:

1.—The more a spiral orbit approaches its asymptote, the more the unequality of the areas, swept in equal times, disappears, and vanishes into equality.

FOURTH LAW:

In any undisturbed celestial orbit the 4th powers of the sideral revolution times are proportional to the seventh powers of the distances.

$$T_0^4 : T_1^4 = \rho_0^7 : \rho_1^7$$

FIFTH LAW: (*Substitute for the 3rd Law of Kepler*)

Upon comparing the standard orbits of different secondary bodies belonging to the same planetary system this law reads:

The squares of the revolution times of standard orbits belonging to one system, are proportional to the third powers of the standard distances.

$$T_0^2 : T_1^2 = D_0^3 : D_1^3$$

Remarks to the FIFTH LAW:

1.—In the event of excentrical asymptotical elliptical orbits, near which the planets are very close, this law reads as follows:

The fourth powers of the revolution times of asymptotical elliptical orbits, belonging to one sytem, are proportional to the third powers of the products of major and minor axes.

$$T_0^4 : T_1^4 = (a_0 b_0)^3 : (a_1 b_1)^3$$

2.—That this improvement does not mean a "slight" difference, but a very "important" difference is demonstrated by computation. In the event of the orbit of *Mercurius* for instance, **Contemporary Astronomy** says *half major axis* = 57,536,434 Kilometer; **A.M.A.** claims it is 58,157,000 Kilometer, which makes a difference of 620,566 Kilometer = nearly double the distance of the earth to the moon.

3.—Still more serious is the effect of this improved law upon the elements of the orbits of the **comets** which can not be determined at all. Since the revolution time has been determined, this fifth law can only reveal to us the product of major and minor axes = $4\,a\,b$.

The excentricity, however, is unknown and moreover is very important. How to arrive at the value of the $\frac{1}{2}$ major axis a ?

What is given to us as such in contemporary books is actually the value = $\sqrt{a\ b}$

What is given in those books as the value of the excentricity is obtained by calculating it with this erroneous value of a, and is therefore worthless.

The solution of the problem of the elements of the orbit of a comet is *not* possible, unless there be another means to arrive at the value of the excentricity.

SIXTH LAW:

Upon comparing the standard orbits of different secondary bodies belonging to different planetary systems (even "outside" our solar system) this Sixth Law reads:

The squares of revolution times of different standard orbits, belonging to different systems, are proportional to the third powers of the standard distances, and inversely proportional to the masses of the systems.

$$T_0^2 : T_1^2 = M_1 D_0^3 : M_0 D_1^3$$

General Remarks

Comparing the two fundamental laws: **Newton's Law** and **my First Law**, we see that, if distances vary in the same ratio, the centrifugal force varies in a faster tempo than does the attractive force and in the same sense. It is therefore obvious that: if any eventuality should disturb the existing relation of equilibrium between those two forces, the result of such eventuality is limited to two cases:

1st Case.—If centrifugal force should by any disturbing impulse suddenly surpass the attractive force any arbitrary amount, then the existing spiral orbit will be altered in another spiral orbit, bent outward, with increasing distances; both forces would decrease, but the centrifugal force would decrease in a faster tempo, in the way that after some time both forces would gradually become equal, and the orbit would vanish into a new asymptotical elliptical orbit.

2nd Case.—In the opposite situation the orbit would be bent inward, distances would gradually decrease, both forces would increase, but the centrifugal force again in a faster tempo. The result would be the same as in the first mentioned case. Other situations do not exist, therefore it is obvious that A. M. A. teaches: there are no parabolic or hyperbolic orbits possible. A. M. A. deals fully with this subject.

Not only converge all computations of A. M. A. in an unshakable system of numerical values of all possible ephemeris, but A.M.A. unveils an abundance of mysteries and puts right many erroneous ideas, and issues various new theories, which at once are: composed, elaborated, explained, and mathematically proved, so that the theories ask only for the most serious criticism in order to be settled.

I will select out of those various theories three examples in order to arouse interest:

1st—**The theory of the origin of satellites** which is fully confirmed by the computations of the twenty best known satellites in our solar system, and which theory is so powerful, that it unveils many mysteries of which I only mention here: the fast rotation of Phobos around Mars; the origin and even the place of origin of the rings of Saturn; the sequence of the times of birth of the satellites of every planet, etc, etc.

2nd—**The mode of derivation of the number of vibrations of the ether in any arbitrary light ray from any arbitrary planetary orbit.**
for instance:

Red light	4×10^{14}	Vibrations in one second.
Yellow light	5×10^{14}	
Blue light	7×10^{14}	

to be derived from the orbit of Neptune or of Phobos.

This derivation gives at the same time the mathematical proof of the theory of LORENTZ, that the light rays are originated by the electrons revolving around the atoms.

And last but not least: this derivation gives the mathematical proof of **the existence of the ether.**

3rd—Another important feature of A.M.A. is the disclosure of the only proper method to arrive at the mathematically exact value of the **mean density of the earth.**

The readers of this brochure will excuse me from giving any further revelations at this time concerning the remarkable discoveries I have made.

I only wish to make the positive statement that I have discovered and worked out my

ANALYTICAL MATHEMATICAL ASTRONOMY

without any co-laborer, and have had no help from any existing astronomical literature; on the contrary, the teachings therein would only show me paths, which I am compelled to consider as not leading to the actual truth.

I claim I am publishing today for the first time in history the six new laws of this science, which are all perfectly rigorous, and I should be pleased to have an opportunity for a public discussion with contemporary scientific men of the concerning connected problems.

In any place of the world!

Science is international!

New York, March 16, 1921,

Temporary Address : 531 West End Avenue,

J. G. A. GOEDHART